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(19) (CA) APPLICATION FOR CANADIAN PATENT (12)

(54) Method of Pre-Treating a Renewal Web Rolled on a Roll
for Adhesion to a Previously Used Web, Particularly
Paper Web for Use in Printing Machines, and Renewal Web
Adhesion System

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(57) 15 Claims

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ABSTRACT OF THE DISCLOSURE.

To prevent uncontrolled movement of the end portion of a renewal web to be applied against the trailing end of a previously used web, typically of paper, to be passed through a rotary printing machine, the end of the renewal web is cut at a slant to form a cut edge (3) extending between 60° to 80° with respect to the direction of roll-off of the renewal web. A coupling strip is then placed over the cut edge, the coupling strip (4) having a first adhesive zone (5) adhered to the top layer of the renewal web, with the non-adhesive central zone overlying the edge (3), and a second adhesive zone overlying the outer surface of the next layer adjacent the outer edge. An adhesive (5", 10, 11) is then applied to the region of the outer layer (2) of the renewal web, starting, for example, from the perforating line and extending over the surface of the renewal web.

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FIELD OF THE INVENTION.

The present invention relates to a system and a method for preparing a renewal web, particularly a paper web, for use in a roll changer of a web-type rotary printing machine, to
5 adhere the leading end of the renewal web to the trailing end of a web roll, which is almost used up.

BACKGROUND.

Rotary web printing machines printing on
a substrate, typically paper, receive a web of paper from a
10 roll. It is customary to store at least two rolls rotatably located on a roll changer, and located in advance of the input path to the printing machine. The web is rolled off a roll.

and printing is effected in the printing machine located downstream from the roll changer. It is desirable, and particularly highly desirable when printing newspapers and the like, to print with as little interruption as possible.

5 The paper from a new roll should be joined to the trailing portion of the paper of the old roll, preferably in a flying or continuous change, so that the machine need not be stopped. The roll changer usually has two tensioning systems one to receive the web from the old roll, and another
10 tensioning system to receive the web from the replacement roll. At least one of the rolls are driven, and the system further can include an apparatus for automatically adhering the start of the replacement roll at the end of the old or previously used roll.

15 Reliable adhesion of the start of the replacement roll web to the end of the previously used roll is only possible if the replacement roll web is previously suitably prepared.

20 Published European Application 0 129 238, Nozaka, describes a system to prepare the new roll. First, the replacement roll is unwrapped, and outer layers of roll paper, which may have been damaged, for example by cuts made when the wrapping has been removed, are likewise taken off the roll. Then, the edge of the web on the outer layer is adhered
25 by a plurality of adhesive strips. The adhesive strips have a central non-adhesive zone, and two adhesive zones at the right and left of the non-adhesive zones. The adhesive strips are aligned with the edge of the roll and are so applied that the central zone is on top of the edge of the top web. It
30 one of the adhesive zones will adhere to the top layer adjacent

the edge and the other adhesive zone on the adjacent portion of the top layer which continues beneath the cut edge of the replacement web.

The roll is then placed into the roll changer.

5 The central zone of the adhesive strip is then perforated by a suitably constructed perforating device in order to facilitate tearing of the adhesive strip when the start of the roll is adhered to the trailing or end portion of the previously used paper roll.

10 This system and method to pre-treat or prepare a replacement roll has some disadvantages. The edge of the web is adhered only at a few locations to the outer layer of the web. As the replacement roll accelerates to the roll-off speed of the printing machine, and hence of the paper web of the
15 previously used web, air will be caught under the beginning of the roll due to the roll-off speed, which leads to lifting of the leading portion of the replacement roll web from the web part therebeneath. As a result, the leading portion may flutter or carry out uncontrolled movement during the adhesion
20 step, known as such, which, for example in eccentrically running rolls, may lead to premature adhesion and, especially, to adhesion which does not extend uniformly over the entire width of the roll. The tearing of the web at the time of adhesion may not be uniform across the width, with the result
25 that misprinting may occur, and, in extreme cases, may lead to interruption of the printing process as such.

A further disadvantage of this system is the
requirement to carry out the perforation of the adhesive
strip with high precision, both with respect to the position of
30 the perforation as well as the steps thereof. On the one hand,

perforation of the web beneath the adhesive strip must be prevented to prevent tearing of the web; on the other hand, the adhesive strip must be completely perforated. The adhesive strips, further, form corners with the edge of the web, which may lead to fissures and tearing starting from the fissures if, upon adhesion, all the adhesive strips are not uniformly applied and then, upon tearing at the perforation, are not uniformly removed. Cutting the web at right angles to the longitudinal direction of the web or, in other webs, to the direction of travel of the web, further is disadvantageous, since all the perforations must tear at precisely the same time; if not, misprinting and possibly misfeed of the renewal web in the printing machine will result.

THE INVENTION.

It is an object to provide a method and system to prepare to pre-treat a renewal web, especially for use in a printing machine, which is reliable and ensures that, even at high removal speed, the leading portion of a new roll is positively adhered to the previously used web without causing difficulties in the printing machine with which the web is to be used, or extensive misprints.

Briefly, the edge of the renewal web is cut at an angle α , which differs from 90° with respect to the direction of roll-off of the renewal web, preferably at an angle between 60° and 80° . The edge is then adhered to the next underlying layer by means of a specially prepared coupling strip. This coupling strip has a central perforated non-adhesive zone and two outer adhesive zones. In accordance with a feature of the invention, the strip is applied to the edge such that the central zone is on top of the edge and that the adhesive zones

will adhere respectively to the beginning portion of the web and to the adjacent portion of the underlying layer. Further, an adhesive is applied to the outer surface of the renewal web adjacent the edge to form an adhesion surface for adhesion against an end portion of the previously used web. This last step of applying an adhesive to the outer surface of the renewal web can be carried out in various ways, for example by providing the coupling strips with a dual adhesive surface, applying adhesive over the surface and/or the strip, or the like.

DRAWINGS:

Fig. 1 is a schematic isometric view of a paper roll, prepared in accordance with the present invention and illustrating the system of preparation; and

Fig. 2 is a schematic fragmentary radial cross-sectional view through the roll, and illustrating the coupling strip.

DETAILED DESCRIPTION

A paper roll 1, used as an example for a roll of renewal web, is ready to be placed in a roll changer; the outer covering, and any possibly damaged top layers of the web of the roll have been removed.

In accordance with a feature of the invention, the web is so cut that the edge 3 of the top layer of the web is at an angle α between the roll-off direction and the edge 3. The angle α must be smaller than 90° and, for example, preferably is between about 60° - 80° . It is then necessary to adhere this now loose edge 3 to the immediately adjacent and

portion of the web which will form the next underlying layer. To do so, and in accordance with a feature of the invention, a specially prepared strip 4 is used to adhere the edge 3 to the end portion 8 of the next underlying layer.

5 The strip 4 is subdivided into three zones 5, 6, 7, see Fig. 2. The outer zone 5 is adhesive both at the upper side as well as at the lower side, that is, the zone 5 has an upper adhesive layer 5' and a lower adhesive layer 5". The central zone 6 is non-adhesive. The other outer zone 7
10 has an adhesive only at one, that is, at the lower side of the strip 4, as shown at 7'.

 The central zone 6 is then formed with a longitudinal perforation 9 (Fig. 1).

15 In accordance with a feature of the invention, the adhesive strip 4 is now so applied to the edge 3 that the central zone 6, with the perforation 9, is on top of the edge 3 of the starting portion 2 of the web on the roll, so that the lower adhesive zone 5' will adhere to the beginning portion 2 of the web and the other adhesive zone 7' of the outer zone 7
20 will be placed on the adjacent portion 8 of the outer layer of the roll.

 Cutting the edge 3 under an angle other than a right angle, and applying the adhesive strip 4 at an angle, ensures that the perforation 9 of the adhesive strip 4 will be
25 reliably torn upon roll changing in an automatic roll changer.

 In the next step, the outer surface of the starting portion 2 of the renewal roll has an adhesive applied thereto, in order to form an adhesion surface which also ensures reliable tearing of the perforation 9.

30 There are various ways to apply this adhesion surface, which need not be continuous over the entire surface

of the starting portion 2 of the roller. Different ways of applying the adhesion surface may be used on any one roll, in various cross-sectional portions thereof.

5 In one type of application, doubly adhesive strips 10 can be applied to the portion 2, extending in any suitable direction, for example circumferentially, or at right angles to the slanting edge 3, or in other selected different positions. Additionally, or in lieu thereof, a surface application of adhesive, as schematically shown at 11, may be used. If a surface adhesive 11 is applied, it is not necessary to form the strip 4 with the double adhesive zone 5, and the outer adhesive layer 5" can be omitted. It is only necessary, then, to apply the surface adhesive 11 also over the strip 4 in the zone 5. The strips 10 have an adhesive at the outer side. In another form of the invention, they can be applied on the strip 5 in form of the layer 5", starting from a region adjacent the perforation line 9, and extending parallel thereto, and overlapping the left, with respect to Fig. 2, end portion of the perforating strip 4, which permits easy application of the strips 10, as shown at 10' in Fig. 1.

20 All the method steps so far described to prepare the roll for flying roll change can be carried out by hand, and using well known manually operable tape dispensers or the like; alternatively, they can be carried out automatically. Roll changers, as well known, may have one or more accessory stations which can apply the various adhesive strips, or adhesives, automatically or machine operated, or the like.

25 The surface adhesive 11 can cover not only the region in the vicinity of the edge 3 and upwardly, over the end portion 2, as shown in Fig. 1; it can also extend over

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the strip 4, for example close to the perforation 9.

It will then form, over the strip 4, an adhesive portion similar to the outer adhesive layer 5".

5 The pre-treating method permits automated preparation of the paper roller 1, or a roll of any other web material suitable as a substrate for printing in a rotary printing machine having, for example, an automatic roll changer. It has these advantages:

10 The portions 2 of the renewal roll, adjacent the cut edge 3 cannot separate from the next layer 8 and, upon automatic roll change, cause flutter and uncontrolled web behavior.

15 The predetermined angle of inclination of the inclined tearing strip provides for precise tearing of the roll, and ensures complete adhesion.

Any uncontrolled lifting of the top layer 2 off the layer 8 is effectively prevented by the adhesive layer 7' on the zone 7 of the strip 4.

20 A strip 4 can be pre-manufactured, apart from the preparation of the roll itself. This permits control of the width of the adhesive strips and of zones 5, 7, and hence of the adhesive-free or non-adhesive zone 6. Such preparation can be easily done, and carried out in automatic machinery. There is no requirement that the perforation 9 in the central zone 6 of the strip and the edge 3 precisely match.

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The preparation of the roll, the separate preparation of the strip, and adhesion of the renewal paper roll to the previously used roll can be easily carried out by automatic machinery.

30 Various changes and modifications may be made within the scope of the inventive concept.

CLAIMS:

1. A method of preparing or pre-treating a renewal web (2) rolled on a roll (1) and particularly a paper web, to provide for adhesion of the renewal web on a trailing portion of a previously used web upon roll-off of the renewal web, comprising the steps of

cutting the edge (3) of the renewal web at an angle (α) which differs from 90° with respect to the direction of roll-off of the renewal web;

providing a coupling strip (4) for coupling the cut edge of the renewal web to the end portion of the previously used web,

said coupling strip having, transversely to its longitudinal extent,

a first outer adhesive zone (5);

a central, non-adhesive zone (6), said central zone being formed with a perforation line (9); and

a second outer adhesive zone (7), opposite said first outer zone;

adhering said outer zones (5, 7) of said coupling strip (4) essentially parallel to said edge (3) on the renewal web, with the perforated central zone of the coupling strip overlying said edge, whereby said adhesive zones will adhere to outer surfaces of the renewal web; and

applying an adhesive to an outer surface of the renewal web adjacent said edge and inwardly of the web, to form an adhesion surface for application against an end portion of the previously used web.

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2. The method of claim 1, wherein one (5) of said outer zones of the coupling strip is doubly adhesive to form two oppositely located adhesive layers (5', 5''); ..

5 and wherein said coupling strip is so applied to the renewal web (2) that one (5') of the adhesive layers adheres to an end portion of said renewal web adjacent said edge (3), and the other adhesive layer (5'') forms at least a part of said adhesive at the outer surface of the web against which the end portion of the previously used web is to be adhered.

3. The method of claim 1, wherein said step of applying an adhesive to an outer surface of the renewal web comprises applying doubly adhesive strips (10) to said outer surface.

4. The method of claim 3, wherein said doubly adhesive strips (10) are applied parallel to the direction of roll-off of the renewal web.

5. The method of claim 1, wherein said step of applying an adhesive to the outer surface of the renewal web comprises applying a surface coating (11) of the adhesive.

6. The method of claim 1, wherein said step of applying an adhesive to an outer surface of the renewal web comprises applying said adhesive immediately adjacent said perforation line.

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7. The method of claim 6, wherein said step of applying said adhesive immediately adjacent the perforation line comprises applying a double-sided adhesive strip (10, 10') having an end or edge portion immediately adjacent said perforating line.

8. The method of claim 7, wherein said double-sided adhesive strip extends in a direction parallel to the direction of roll-off of the renewal web.

9. The method of claim 6, wherein said step of applying an adhesive to the outer surface of the renewal web comprises applying a surface coating (11) of adhesive on the end portion of the renewal web, starting at said perforation line (9).

10. The method of claim 1, wherein said angle (α) is about 60° - 80° .

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11. The combination of a renewal roll (1) of a rolled web, particularly paper web, for use in a rotary printing machine,

with

5 a system to provide adhesion of an end portion of said web to a trailing end portion of a previously used web upon roll-off of the renewal web,

10 wherein the edge (3) of the renewal web (2) forms an angle (α) which differs from 90° with respect to the direction of roll-off of the renewal web; and

said means providing for adhesion comprises

a coupling strip (4) for coupling the cut edge of the renewal web to the end portion of the previously used web,

15 said coupling strip having, transversely to its longitudinal extent,

a first outer adhesive zone (5);

a central, non-adhesive zone (6), said central zone being formed with a perforation line (9); and

20 a second outer adhesive zone (7), opposite said first outer zone;

25 said coupling strip being adhered with said outer zones (5, 7) adjacent said edge (3) of the renewal strip with the central, perforated zone (6) of the coupling strip overlying the edge, whereby said adhesive zones will adhere on the outer surface of the renewal web; and

said combination further including an adhesive region (5", 10, 10', 11) and extending at least from the perforating line over an end region of the renewal web to form an adhesive surface against the end portion of the previously used web.

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12. The combination of claim 11, wherein said coupling strip has one (5) end zone which is doubly adhesive to provide a lower and an upper adhesive layer (5', 5''), said lower adhesive layer being applied adjacent said edge (3) on the renewal web, and said upper adhesive layer (5'') forming at least part of said adhesive region.

13. The combination of claim 11, further including doubly adhesive strips (10, 10') located on the end region of said renewal web.

14. The combination of claim 13, wherein said doubly adhesive strips (10) extend essentially in the direction of roll-off of the renewal web.

15. The combination of claim 13, wherein said doubly adhesive strips (10') extend approximately parallel to and starting at said perforating line (9).

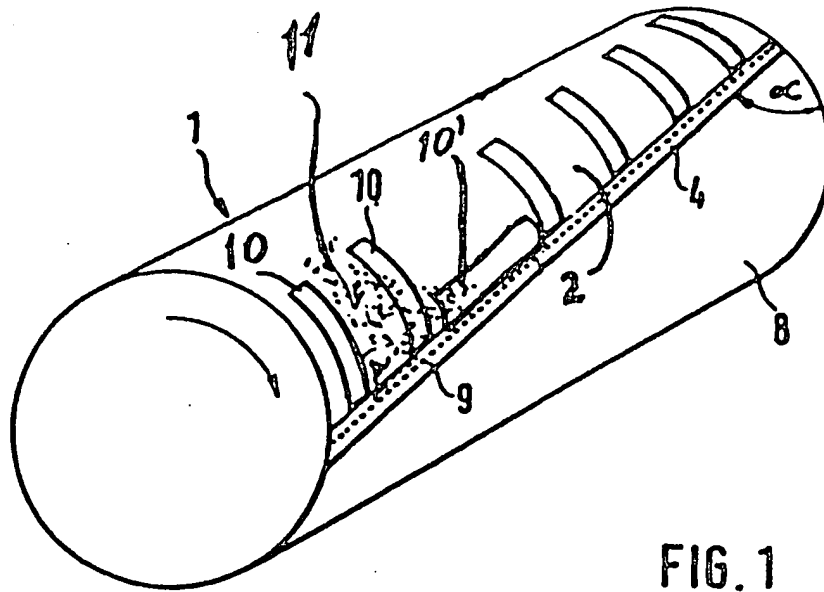


FIG. 1

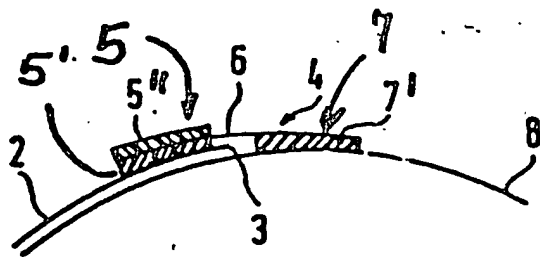


FIG. 2

Robert F. Co., Inc. Company